

CLAIMS

What is claimed is:

Sub B1
5 1. A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

printing different areas of a diagnostic pattern at different passes of one or more ink-jet printheads with a controlled amount of media advances between the passes, to accumulate media advance error between the printing of the different areas; and

10 examining the diagnostic pattern to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

2. The method of Claim 1, wherein said printing different areas comprises:

printing a first area comprising a first set of pixels printed during a first pass;

5 conducting a plurality of incrementally media advances;

10 printing a further area comprising a second set of pixels printed during a further pass, wherein media advance errors resulting from said plurality of media advances are accumulated between printing said first area and printing said further area.

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3. The method of Claim 1 wherein said different areas are nominally aligned along a horizontal line.

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4. The method of Claim 1, wherein said step of examining the diagnostic pattern is conducted visually by a user.

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5. The method of Claim 1, wherein said step of examining the diagnostic pattern is conducted by an optical sensor comprising the printing system.

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6. The method of Claim 1, further comprising an initial step of checking for printhead health and taking any corrective needed action prior to printing said diagnostic pattern.

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7. The method of Claim 1, wherein said step of printing different areas of a diagnostic plot includes:
applying a diagnostic multi-pass print mode mask, wherein a plurality of carriage passes are employed to print the area subtended by a printhead nozzle array, the diagnostic print mode mask comprising a rectilinear grid of pixels, with each pixel location having a number associated therewith, the number representing the pass in which the pixel will be printed, and wherein said different areas include a first set of pixels on a row of said grid, and a second set of pixels on said row, and wherein said first set of pixels is printed on a different pass than said second set of pixels is printed.

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8. The method of Claim 7, wherein said diagnostic print mode mask defines that the first $w/2$ pixels in the row are printed in the same pass (a_i), and the last $w/2$ pixels in the row are printed in another pass (b_i).

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9. The method of Claim 8, wherein said diagnostic print mode mask includes a row wherein said first w/2 pixels are printed in a first pass, and said last w/2 pixels are printed in a last pass of said plurality of passes.

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10. A diagnostic method for visual detection of poor media advance calibration in an ink-jet printing system, comprising:

5 providing an ink-jet printhead mounted on a carriage, the carriage mounted for movement along a scan axis;

providing a media advance system for advancing a print medium along a media path which is transverse to the scan axis;

entering a diagnostic multi-pass print mode;

10 printing different areas of a diagnostic plot at different passes using said ink-jet printhead with a controlled amount of media advances between the passes to accumulate media advance error between the printing of the different areas; and

15 examining the diagnostic plot to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

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11. The method of Claim 10, wherein said printing different areas comprises:

printing a first area comprising a first set of pixels printed during a first pass;

5 conducting a plurality of incrementally media advances;

printing a further area comprising a second set of pixels printed during a further pass, wherein media advance

10 errors resulting from said plurality of media advances are accumulated between printing said first area and printing said further area.

12. The method of Claim 10 wherein said different areas are nominally aligned along a horizontal line.

13. The method of Claim 10, wherein said step of examining the diagnostic pattern is conducted visually by a user.

14. The method of Claim 10, wherein said step of examining the diagnostic pattern is conducted by an optical sensor comprising the printing system.

15. The method of Claim 10, further comprising an initial step of checking for printhead health and taking any corrective needed action prior to printing said diagnostic pattern.

16. The method of Claim 10, wherein said step of printing different areas of a diagnostic plot includes:

applying a diagnostic multi-pass print mode mask, wherein a plurality of carriage passes are employed to print the area subtended by a printhead nozzle array, the diagnostic print mode mask comprising a rectilinear grid of pixels, with each pixel location having a number associated therewith, the number representing the pass in which the pixel will be printed, and wherein said different areas include a first set of pixels on a row of said grid, and a second set of pixels on said row, and wherein said first

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set of pixels is printed on a different pass than said second set of pixels is printed.

Sub B6

17. The method of Claim 16, wherein said diagnostic print mode mask defines that the first w/2 pixels in the row are printed in the same pass (a₁), and the last w/2 pixels in the row are printed in another pass (b₁).

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18. The method of Claim 17, wherein said diagnostic print mode mask includes a row wherein said first w/2 pixels are printed in a first pass, and said last w/2 pixels are printed in a last pass of said plurality of passes.

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19. A multi-pass diagnostic print mode mask for visual detection of poor media advance calibration in an ink-jet printing system including a printhead having a nozzle array, wherein a plurality of carriage passes are employed to print the area subtended by a printhead nozzle array, the diagnostic print mode mask comprising a rectangular grid of pixels, with each pixel location having a number associated therewith, the number representing the pass in which the pixel will be printed, and wherein said

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different areas include a first set of pixels on a row of said grid, and a second set of pixels on said row, and wherein said first set of pixels is printed on a different pass than said second set of pixels is printed.

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20. The mask of Claim 16, wherein said diagnostic print mode mask defining that the first w/2 pixels in the row are printed in the same pass (a₁), and the last w/2 pixels in the row are printed in another pass (b₁).

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21. The mask of Claim 20, wherein said diagnostic print mode mask includes a row wherein said first w/2 pixels are assigned to be printed in a first pass, and said last w/2 pixels are assigned to be printed in a last pass of said plurality of passes.

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22. A diagnostic method for improving print quality in an ink-jet printing system, comprising:

providing an ink-jet printhead mounted on a carriage, the carriage mounted for movement along a scan axis;

5 providing a media advance system for advancing a print medium along a media path which is transverse to the scan axis;

entering a diagnostic multi-pass print mode;

determining whether the nozzle array has good health;

10 if the nozzle array has good health, printing different areas of a diagnostic plot at different passes using said ink-jet printhead with a controlled amount of media advances between the passes to accumulate media advance error between the printing of the different areas; and

15 examining the diagnostic plot to determine whether the accumulated media advance error is sufficiently objectionable to take corrective action.

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